Method and device for transferring springs into an assembler

Field of the Invention

The invention relates to a method and a device for transferring springs into holding means of an assembler, according to the preamble of patent claims 1 and 7.

Prior Art

In the manufacture of spring cores for mattresses, paddings or seat cushions, springs are wound in a spring winding machine, transferred via a spring winding station to a spring conveyor and fed by the latter via a transfer device to an assembly device which is also called an assembler. In this assembly device, coil wires are guided through the individual spring rows and the individual springs are thus connected to one another to form spring cores.

DE-A-24 13 033 discloses an assembler of this type. US-A-3 774 652 describes a transfer device which has rotary tables, in order to rotate the springs into desired positions before they are transferred into the assembler.

DE-A-1 552 150 discloses a transfer device which has individual gripping arms for transferring individual springs, the gripping arms being guided in a slotted guide track.

If springs are missing, a spring is oriented incorrectly or other faults occur, this fault has to be corrected by hand in the region of the assembler. However, the transfer device impedes free access to the assembler and therefore has to be removed first of all

in a relatively laborious manner. This leads to a relatively long interruption of production whenever a fault occurs.

Furthermore, DE-A-195 42 844 discloses a transfer device having a sliding bar which is connected to a rotational pin via a lever. Here, a rotation of the rotational pin is converted into a horizontal displacement of the bar. Individual slides which bear against inner sides of a respective run of a belt conveyor under spring loading are arranged on the bar. The springs which are delivered clamped between these belt conveyors can be pushed out of the region of the belt conveyors into assembly tongs by means of these slides. When a fault occurs in this system, the assembler is removed by being pushed away from the transfer device which is connected to the conveyor. As a result, the operating personnel can move into a gap between the belt conveyor and the assembler and fix the fault. This is relatively time-consuming and complicated.

Furthermore, the transfer device or parts thereof usually also have to be exchanged if the type and shape of the springs are changed. This exchange is often time-consuming and complicated in the known transfer devices.

Summary of the Invention

It is therefore an object of the invention to provide a method and a device for transferring springs into holding means of an assembler, which method and device make access to the transfer station possible in a simple manner.

This object is achieved by a method and a device having the features of patent claims 1 and 7, respectively.

In the method according to the invention for transferring springs, the latter are delivered in a conveying direction by means of a spring conveyor arranged one behind another in a row and are transferred in groups and perpendicularly with respect to the conveying direction into the holding means of the assembler. Here, they are delivered directly from the spring conveyor into the assembler with avoidance of a dedicated transfer device. For this purpose, the spring conveyor protrudes into the assembler. A sliding bar which is used for transferring the springs from the spring conveyor to the assembler can be removed from the transfer region in a simple manner; in particular, it can be lowered. Faults during transfer can thus be fixed in a simple manner.

Furthermore, it is advantageous that the size of the system is minimized.

Furthermore, it is an object of the invention to provide a method and a device, the sliding bar of which can be moved relatively simply and can be exchanged in a simple manner.

This object is achieved by a method and a device having the features of patent claims 3 and 9, respectively.

In this method and this device, the springs are displaced by means of the sliding bar, by the sliding bar being displaced along a horizontal path which is predefined by at least one slotted guide track, for transferring the springs. This variant or embodiment can also be used in a dedicated transfer device, for example in a system which has a spring conveyor, an assembler and the transfer device, the spring conveyor running between the assembler and the transfer device.

Further advantageous variants of the method and advantageous embodiments emerge from the dependent patent claims.

Brief Description of the Drawings

In the following text, the subject matter of the invention will be explained by using a preferred exemplary embodiment which is shown in the appended drawings, in which:

figure 1 shows a diagrammatic side view of an assembler having a transfer unit according to the invention which is integrated into the assembler;

figure 2 shows a view from above of the assembler according to figure 1;

figure 3 shows a diagrammatic side view of the transfer unit according to figure 1, and

figure 4 shows a view from above of the transfer unit according to figure 3.

Ways of Implementing the Invention

Figures 1 and 2 show an assembler or an assembly machine, into which a transfer unit 1 having a sliding bar 16 is integrated according to the invention, with the result that a dedicated transfer device is not necessary.

For this purpose, side plates 10 which protrude partially beyond the frame 2 are fastened to one longitudinal side of the frame 2. A first end face or end side of the frame 2 is penetrated by a spring conveyor which protrudes into the assembler at least as far as a transfer station and therefore transports the

springs into the assembler with avoidance of a dedicated transfer device. In the example which is described here, this spring conveyor is formed by two conveyor belts 4, 5 which run parallel to one another and above one another and circulate endlessly.

Otherwise, the assembler corresponds substantially to the assemblers which are known in the prior art. For example, it has upper and lower tongs carriers 6, 7 having a plurality of tongs 70 which accommodate springs which are arranged behind one another in rows. Other holding means can also be used instead of the upper and lower tongs. Furthermore, the assembler has a wire coil feeding device 3 which is preferably arranged on one end side of the frame 2. By means of this feeding device 3, a coil wire can be wound through the spring rows which are held in the tongs 70 and, as a result, can connect the springs to form a spring coil.

For this purpose, the springs are delivered one after another, that is to say in rows, to the transfer station of the assembler by means of the spring conveyor. During transport, the springs are clamped individually between the lower and the upper conveyor belts 4, 5 in a prestressed manner. In the transfer station, the springs are transferred in groups into the holding means, the transfer taking place parallel to the plane of the conveyor belts and perpendicularly with respect to the conveying direction. For this purpose, the springs are pushed into the holding means 70 by means of a sliding bar 16 which is mounted displaceably between the two side plates 10. Here, the drive takes place on each side via a first gearwheel 11' which is driven by motor and is connected to in each case one second gearwheel 11 via a drive chain 12. A driver 15 which slides along a guide rod 14 which runs parallel to the displacement direction is fastened to the drive chain 12. Here, the driver 15 penetrates a horizontally running slot 14' in the side plate 10.

Firstly, the sliding bar 16 is fastened pivotably on the driver 15, the sliding bar 16 being connected fixedly to a connecting rod 18 which is in turn arranged pivotably on the driver 15 via a rotational bearing 15'. Secondly, the driver 15 is connected via the same rotational bearing 15' to a lever 19, as can be seen in figure 3. The lever 19 is connected fixedly in terms of rotation to the connecting rod 18.

A running roller or guide roller 19' which rolls along a slotted guide track 13 is arranged at the free end of the lever 19. This slotted guide track 13 is made in the side plate 10 and extends at least approximately horizontally and therefore in the perpendicular direction with respect to the conveying direction in a front region which faces the transfer station. In the rear region, it is configured to curve downward.

As can be seen in figure 3, the sliding bar 16 can therefore assume different positions. In order to transfer the springs F, it can be moved along the horizontal path of the slotted guide track 13 or along the horizontal guide rod 14 in the horizontal direction transversely with respect to the conveying direction, with the result that the springs F are displaced from the transfer station to the holding means. In figure 3, A denotes the position of the sliding bar 16 before transfer of the springs F, B denotes the outermost possible position of the sliding bar which can be reached during the transfer of the springs F, and C denotes a position which is a service position.

The position B is shown in a somewhat exaggerated manner for better clarity of the drawing. It is not necessary that the sliding bar 16 is displaced so far forward. However, it is usually removed again completely from the region of the two conveyor belts 4, 5 after each transfer, as is shown in position A.

In the service position according to designation C, the sliding bar 16 is inclined downward toward the transfer station. As a result, it releases the transfer station, that is to say the two conveyor belts 4, 5, with the results that the latter are then easily accessible, without it being necessary for any parts of the transfer station to be removed.

The transfer station T can be seen in figure 4. Said transfer station T is defined by that section of the two conveyor belts 4, 5 which lies in the region of the sliding bar 16, that is to say it is that section of the spring conveyor, from which the springs are transferred into the holding means 70. The conveying direction of the spring conveyor is shown in figure 4 with a single arrow, and the displacement direction of the sliding bar 16 is shown with a double arrow.

Furthermore, sliding guides 17 can be seen in figure 4, which sliding guides 17 are arranged in the front region of the sliding bar 16. These sliding guides 17 are adapted to the external shape of the respective springs F. Here, they are therefore configured in the shape of a semicircle. However, they can also be in the shape of a partial circle, an ellipse or a corner. The sliding guides 17 are usually vertical c-shaped elements which are fastened to the sliding bar 16. The elements are preferably not prestressed or of resilient configuration. However, they preferably have, at least in their upper and lower regions, the abovementioned recess which is adapted to the spring shape. In addition, the upper and lower surfaces of the elements are preferably manufactured from a material having good sliding properties, for example Teflon.

The spacings between the elements are usually adapted accordingly to the spacings between the delivered springs. However, it is also possible to configure the

sliding guides 17 as integral constituent parts of the sliding bar 16.

Irrespectively of the type of the arrangement of the sliding guides 17 on the sliding bar 16, they can be exchanged in a simple way, by the sliding bar 16 itself being released from the rotational bearing 15' and being removed from the assembler. The down times of the machine during changing of the springs or the sliding guides 17 can therefore be minimized.

The method according to the invention and the device according to the invention therefore make access possible in a simple manner to the assembler or to the location, at which the springs are transferred into the holding means. Furthermore, the transfer itself can be controlled in a simple manner. In addition, the system can be refitted in a very short time if the spring types are changed. As the conveyor protrudes into the assembler, the entire system can additionally be of extremely compact design.

List of Designations

F	Spring
T	Transfer station
1	Transfer unit
10	Side plate
11	First gearwheel
11′	Second gearwheel
12	Drive chain
13	Slotted guide track
14	Guide rod
14′	Slot
15	Driver
15′	Rotational bearing
16	Sliding bar
17	Sliding guide
18	Connecting rod
19	Lever
19′	Guide roller
2	Frame of the assembler
3	Wire coil feeding device
4	Upper conveyor belt
5	Lower conveyor belt
6	Upper tongs carrier
7	Lower tongs carrier
70	Tongs